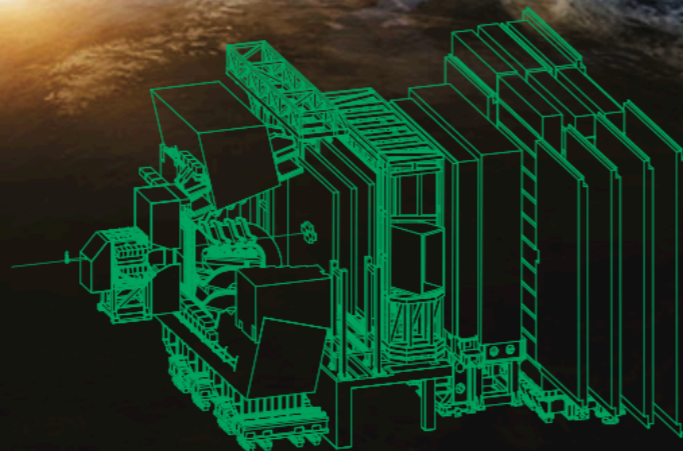




CERN/LHCC 2021-012
LHCb TDR 23
24 February 2022

Framework LHCb UPGRADE II



Technical Design Report



LHCb Upgrade II next steps

Matteo Palutan

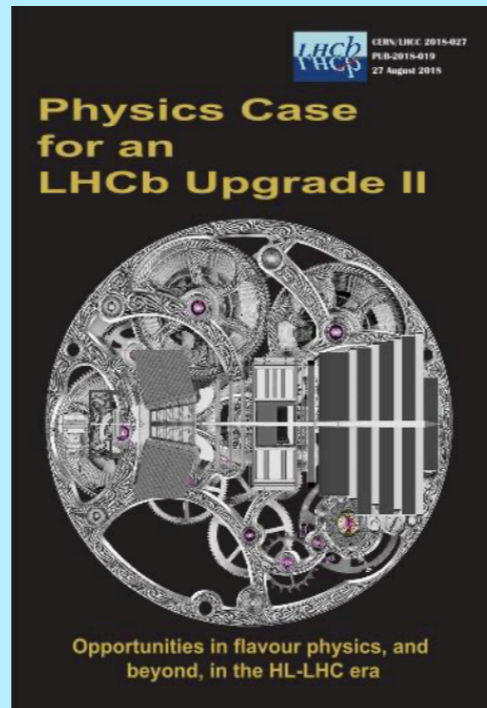
(INFN-Frascati)

Muon meeting, November 15th 2022

Upgrade II: approval steps so far

Eol

Physics case



[LHCC-2017-003](#)

[LHCC-2018-027](#)

Accelerator study

[CERN-ACC-2018-038](#)

CERN Research Board September 2019

“The recommendation to prepare a framework TDR for the LHCb Upgrade-II was endorsed, noting that LHCb is expected to run throughout the HL-LHC era.”



[LHCC-2021-012](#)

Approved March 2022

- *Detector design and technology options*
- *R&D program and schedule*
- *Cost for baseline, options for descoping*
- *National interests*



Approval: next steps

An approval process in multiple steps, based on what has been done for ATLAS/CMS phase 2, has been proposed by the LHCC and recently agreed with the RRB

DONE!

1.1 Letter of Intent: *overall description of the upgrade programme, with discussion of physics notation and performance, detector elements, plan for R&D, technologies*

“LHCb has fulfilled this step with the submission of the EoI, the Physics case document and the FTDR, all very favourably review by LHCC”

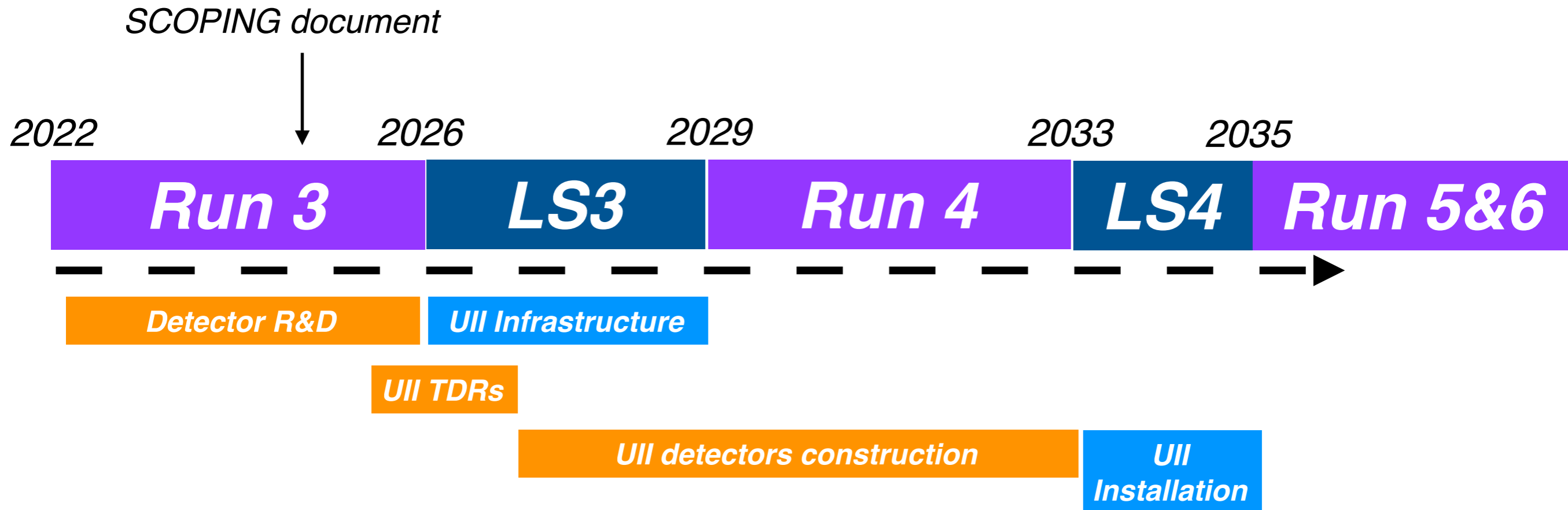
WE'RE HERE

1.2 Scoping Document: *estimated cost scenarios (baseline and descoped) with analysis of physics performances, person-power and funding profiles, project organisation and milestones, list of TDRs and project schedule; the document will be complemented by a money matrix (country vs sub detectors) to be agreed with Funding Agencies (will be kept confidential)*

“It is recognised that the LHCb Upgrade FTDR already includes some elements foreseen for the Scoping Document, such as selected descoping options with a brief description of the corresponding cost reduction and the expected impact on the physics programme, and indications of national interests in detector system”

We plan to produce the Scoping Document within the next 2 years

Timeline for Upgrade II



A timeline of ≈ 2 years for the Scoping Document seems relevant for 2 reasons:

- keep momentum in the discussion with the funding agencies, and secure the project funding, in a situation of increasing competition (NA62, BelleII, ...)*
- plan the relevant work on infrastructure preparation (LHC and LHCb) at LS3*

News from the RRB (oct. 2022)

The ongoing effort on detector R&D was very well received

There's a strong support from CERN management to keep pace in issuing the Scoping Document in order to help convergence from the various countries

Things are start moving in several countries, with discussions being organised, or about to start, to define investments and/or define the steps to reach a decision. 1.5-2 years seems in general a good target to have a more comprehensive view of the scope of the project. Some of the decisions will come definitely later.

- UK has already obtained the full pledge (~25 MCHF), CERN officially stated that they will guarantee their fair share (~20 MCHF)
- IN2P3 (France) will discuss the project beginning of next year and then apply for funds with the ministry, similar approach in Germany
- INFN declared that the internal decision process will start in 2023

Scoping Document

What is needed:

- *assessment of physics losses for descoped option (approx. studies)*
- *for each project, the cost envelope for the baseline proposal and for descoped one*
- *the list of the interested institutes, and the expected investment (no commitments yet, it is possible that the baseline is not fully covered at this stage)*

Rapporti con la Russia

"The CERN Council met this week, and high on the agenda was a topic that deeply concerns us all: the ongoing brutal invasion of Ukraine by the Russian Federation, aided by the Republic of Belarus. Yesterday the CERN Council declared that it intends to terminate CERN's International Cooperation Agreements with Russia and Belarus at their expiration dates in 2024. However, the situation will continue to be monitored carefully and the Council stands ready to take any further decision in the light of developments in Ukraine. These measures confirm the Council's strong condemnation of the invasion, while leaving the door open for continued scientific collaboration should conditions allow in the future."

- ***Non e' possibile al momento coinvolgere formalmente gli istituti russi nelle discussioni su Upgrade II***
- ***La preparazione dello scenario per lo scoping document non può assumere il loro contributo***
- ***La presenza della sola Italia per il MUON e' un problema che dovremo affrontare***

Scoping Document: the MUON case

Relevant for the MUON detector

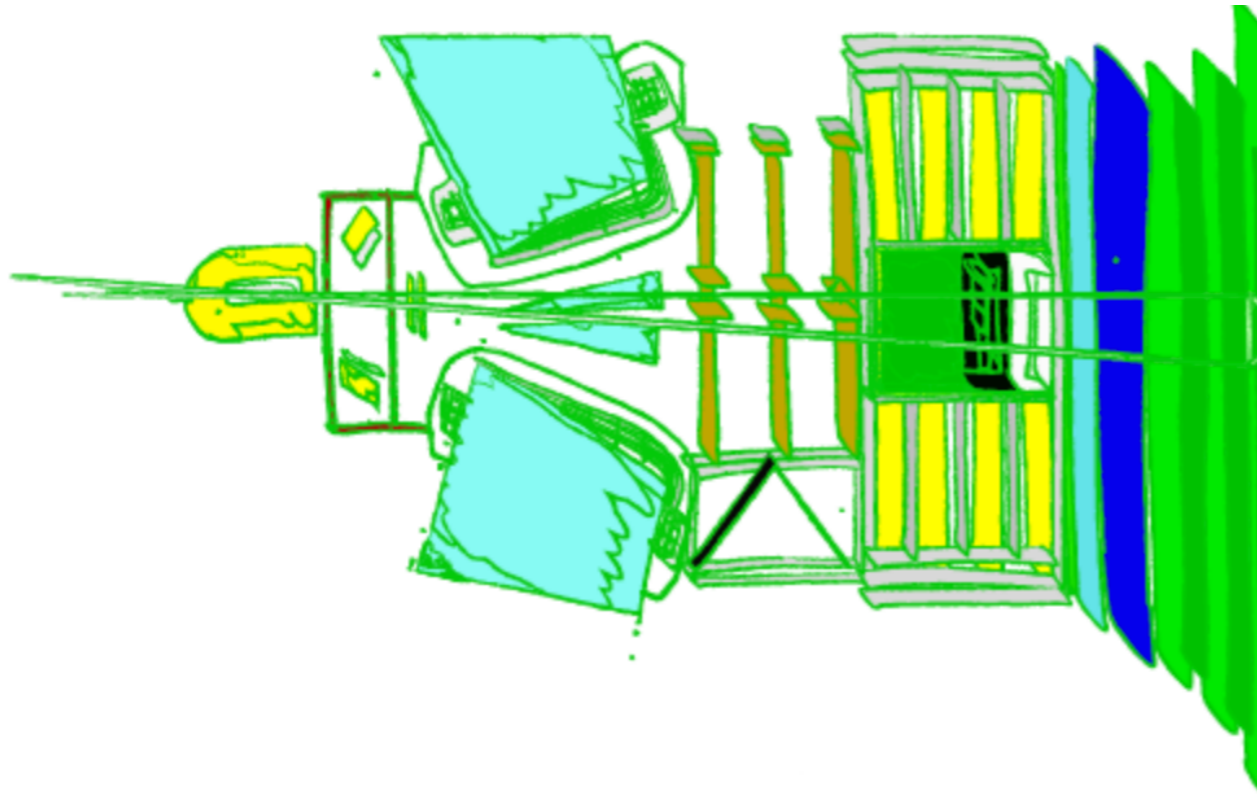
- *substantial changes wrt FTDR need to be documented with more detail
→ we may be in this situation if we understand that we cannot keep the MWPCs in the external regions of the detector*
- *cost increase wrt FTDR are still possible, but need to be well justified
→ this is expected in case we need to replace the MWPCs*
- *increase of cost after the Scoping Document becomes much more difficult*

In conclusion:

- *we need to understand what is the baseline proposal for our detector*
- *we need to understand what are the groups contributing*

The two aspects may be correlated...

2023: its time for a new Ull workshop!



*"Vth Workshop on
LHCb Upgrade II"*

RELOADED

***29-31 March 2023 in
Barcelona (really, not
virtually!)***